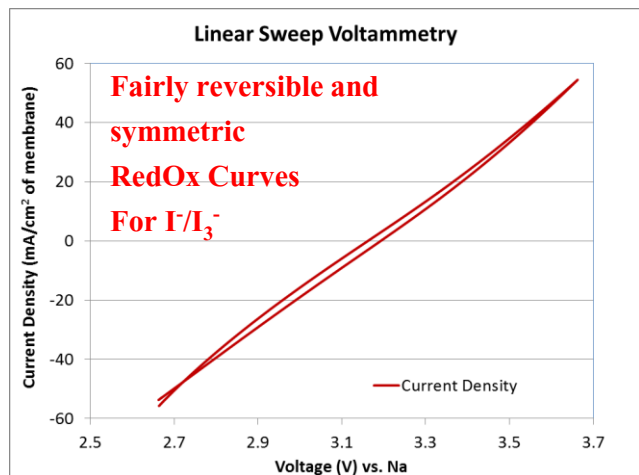


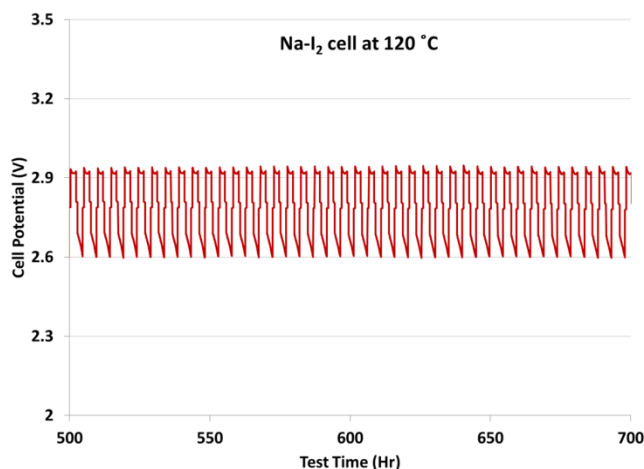
Development of NaSICON Membrane based Sodium-Iodine Battery

Ceramatec Sodium Battery Team: Andrew Mullenax, Matthew Robins, Alexis Eccleston, Mukul Bokil, Tom Meaders and Sai Bhavaraju (presenting)

Ceramatec, Inc. is developing a 120 °C Na-I₂ Battery utilizing a NaSICON sodium-selective membrane to be a low-cost, safe, long-life and high efficiency energy storage solution.



Metric	Na-S	Na-I ₂
Increased Cell Voltage	2 V	2.8 to 3.4 V ✓ 1/3rd fewer cells compared to Na-S
Increased Energy Density	~ 180 Wh/kg	~ 200 Wh/kg ✓ Comparable energy density to Na-S
Lower Operating Temperature	> 300 °C	120 °C ✓ Moderate temperature while retaining high power ✓ Plastic components used in Battery construction
Module Production cost	300 \$/kWh	< 200 \$/kWh
Safety	Low safety	Safe due to formation of non-combustible salts



Na-I₂ cell w organic catholyte
160 50% DOD cycles with energy efficiency of 87.5 % @ 10 mA/cm² & C/3.5 rate

Projected Cost	Worst Case (\$/kWh)	Probable (\$/kWh)	Best Case (\$/kWh)
Unit Cell	231.3	146.3	89.0
Module	267.3	175.3	111.0

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